Investigation: What connects these things?

Why was 1816 the “The Year with no Summer”?

Notes for teachers

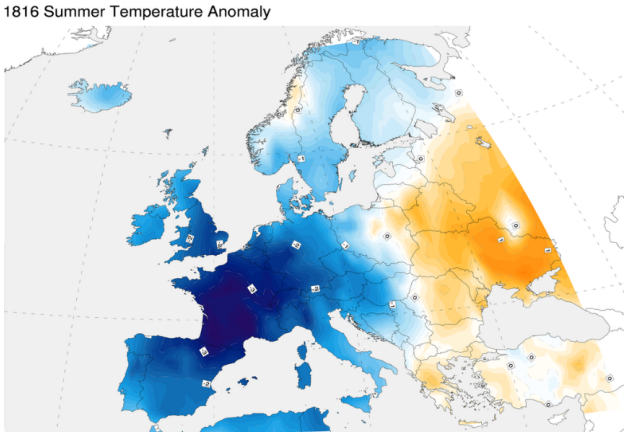
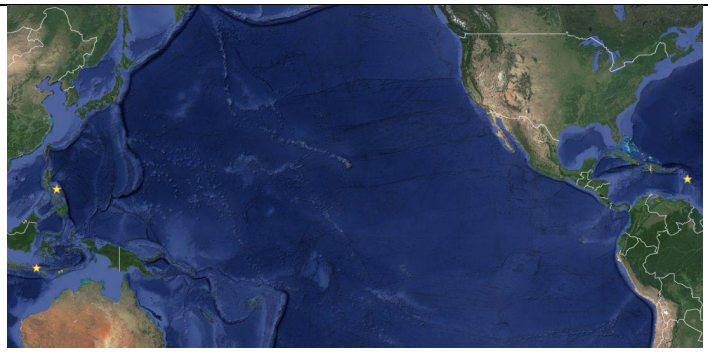
Either

1) Give each small group a selection of pieces of evidence (selected on the basis of the ability of the group) and ask them between them to work out what the connection is as a card sorting exercise.

Or

2) Hand out all the pieces of evidence, one to each student. They may not show anyone else their clue, but should read it out or describe it. Students should then work together to find out what the event was and how it was linked to the evidence they received.

You may like them just to consider the volcanic activity, or also take into the account the solar Dalton Minimum and Little Ice Age.

"I had a dream, which was not all a dream. The bright sun was extinguish'd, and the stars Did wander darkling in the eternal space, Rayless, and pathless, and the icy earth Swung blind and blackening in the moonless air; Morn came and went – and came, and brought no day, And men forgot their passions in the dread Of this desolation; and all hearts Were chill'd into a selfish prayer for light" Lord Byron, 1816	 Chichester Canal, painted in 1828 by J.M.W. Turner
 1816 summer temperatures – the difference to normal	 Volcanic Eruptions: Tambora, Indonesia, 1815, La Soufriere, Saint Vincent (1812) and Mayon in the Philippines (1814)
	*On the night of 6th instant, after a cold day, Jack Frost paid another visit to this region of the country, and nipped the beans, cucumbers, and other tender plants. This surely is cold weather for summer. On the 5th we had quite warm weather, and in the afternoon copious showers attended with lightning and thunder -- then followed high cold winds from the northwest, and back again the above mentioned unwelcome visitor. On the 6th, 7th, and 8th June, fires were quite agreeable company in our habitations.* Boston Independent Chronicle, 17th **June** 1816

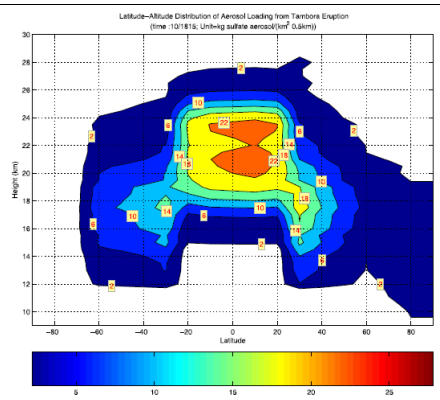


Figure 7. Latitude-altitude distribution of sulfate aerosol loading for October 1815, 6 months after the Tambora eruption.

Volcanic particles in the upper atmosphere

Justus von Liebig was 13 when Tambora erupted; he grew up to be a brilliant chemist, pioneering nutritional science and inventing infant formula.

12,000 people on the Island of Sumbawa died as a result of the explosion, including two whole kingdoms

44,000 people died of famine in Lombok
English and French wheat harvests failed in 1816

Complete harvest failure in southern Germany

2,000 starving people rioted in Dundee, summer 1816

65,000 people starved to death in Ireland

In 1817, 11.5% of Parisians described as destitute

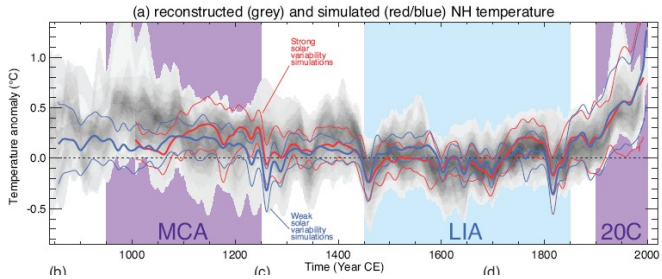
Many thousands of people migrated around Europe, with tens of thousands leaving northern England,

Ireland and northern Germany for North America.

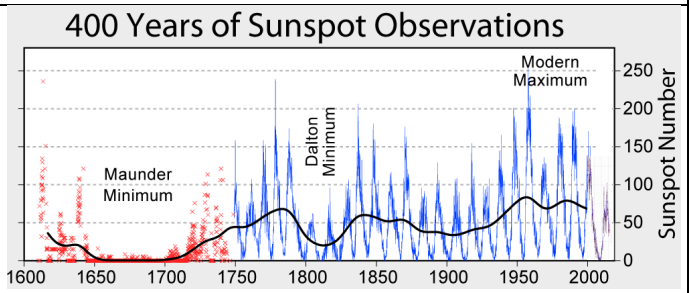
In Switzerland, the death rate was 56% higher in 1817 than in 1815.

"This was succeeded, for nearly an hour, by a tremendous motion of the earth, distinctly indicated by the tremor of large window frames; another comparatively violent explosion occurred late in the afternoon, but the fall of dust was barely perceptible. The atmosphere appeared to be loaded with a thick vapour: the Sun was rarely visible, and only at short intervals appearing very obscurely behind a semi-transparent substance"

A British resident of eastern Java, April 11th 1815



Northern Hemisphere Temperatures



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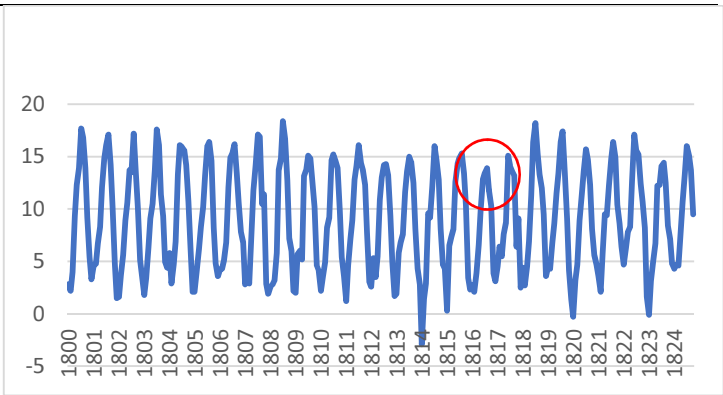
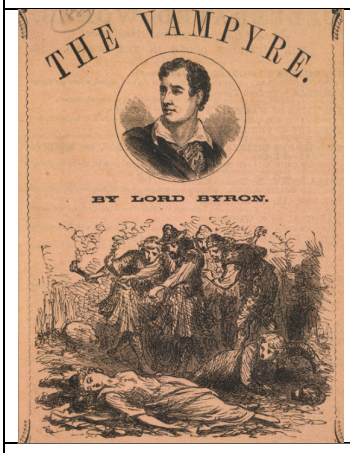
The first explosions were heard on this Island in the evening of the 5th of April (1815), they were noticed in every quarter, and continued at intervals until the following day. The noise was in the first instance almost universally attributed to distant cannon; so much so, that a detachment of troops were marched from Djocjocarta [a nearby province] in the expectation that a neighbouring post was attacked. And along the coast boats were in two instances dispatched in quest of a supposed ship in distress.
Account by Sir Thomas Raffles, British Governor of Java



Central England Temperature data for 1800-1825, temperature in °C



In June 1816, "incessant rainfall" during that "wet, ungenial summer" forced Mary Shelley, John William Polidori, and their friends to stay indoors at Villa Diodati overlooking Lake Geneva for much of their Swiss holiday. They decided to have a contest to see who could write the scariest story, leading Shelley to write Frankenstein, or The Modern Prometheus and Lord Byron to write "A Fragment", which Polidori later used as inspiration for The Vampyre — a precursor to Dracula. In addition, Lord Byron was inspired to write the poem "Darkness", by a single day when "the fowls all went to roost at noon and candles had to be lit as at midnight"